

REMARKS

This Amendment and Response to Non-Final Office Action is submitted in response to the non-final Office Action mailed July 7, 2006. Claims 1-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Britton et al. (U.S. Patent No. 6,401,136) in view of Piskiel et al. (U.S. Patent No. 5,916,307) and still in further view of Brasher et al. (U.S. Patent No. 6,895,586).

In response to the above rejection, Claims 1, 12, and 23 have been amended to further clarify the subject matter which Applicants regard as the invention. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments, reconsideration of the Application is respectfully requested in view of the following remarks.

Applicants wish to thank the Examiner for the telephone interview on Monday, October 2, 2006 in which the above mentioned amendments were discussed.

Rejection of Claims 1-33 Under 35 U.S.C. 103(a) – Britton et al., Piskiel et al., and Brasher et al:

Claims 1-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Britton et al. (U.S. Patent No. 6,401,136) in view of Piskiel et al. (U.S. Patent No. 5,916,307) and still in further view of Brasher et al. (U.S. Patent No. 6,895,586).

Claim 1 has been amended to recite:

A method, implemented by a communication coordinator on a module, for carrying out reliable communication in a communication system, comprising:

receiving a message from a sender intended for one or more applications, said message comprising a message identifier, and wherein said message identifier comprises a message sequence indicator;

determining based upon said message identifier whether said message had previously been received, ***wherein determining whether said message had previously been received comprises: determining whether said message sequence indicator is one of the sequence indicators in a set of missing sequence indicators maintained in a table; and in response to a determination that said message sequence indicator is not one of the sequence indicators in said set of missing sequence indicators, concluding that said message had previously been received***; and

in response to a determination that said message had previously been received, foregoing delivery of said message to said one or more applications;

wherein a message exchange between a sender and a receiver is conducted ensuring that a message is delivered to a recipient at most once; and

wherein a subscriber is enabled to subscribe to multiple events using a single namespace specification and a single subscription request.

Similarly, Claim 12 has been amended to recite:

An apparatus for implementing reliable communication in a communication system, comprising:

a mechanism for receiving a message from a sender intended for one or more applications, said message comprising a message identifier, wherein said message identifier comprises a message sequence indicator; a mechanism for determining based upon said message identifier whether said message had previously been received, and ***wherein said mechanism for determining whether said message had previously been received comprises: a mechanism for determining whether said message sequence indicator is one of the sequence indicators in a set of missing sequence indicators maintained in a table; and a mechanism for concluding, in response to a determination that said message sequence indicator is not one of the sequence indicators in said set of missing sequence indicators, that said message had previously been received***; and

a mechanism for foregoing, in response to a determination that said message had previously been received, delivery of said message to said one or more applications;

wherein a message exchange between a sender and a receiver is conducted ensuring that a message is delivered to a recipient at most once; and

wherein a subscriber is enabled to subscribe to multiple events using a single namespace specification and a single subscription request.

Similarly, Claim 23 has been amended to recite:

A computer readable medium comprising instructions which, when executed by one or more processors, cause the one or more processors to implement reliable communication in a communication system, said computer readable medium comprising:

instructions for causing one or more processors to receive a message from a sender intended for one or more applications, said message comprising a message identifier, wherein said message identifier comprises a message sequence indicator;

instructions for causing one or more processors to determine based upon said message identifier whether said message had previously been received, and ***wherein the instructions for causing one or more processors to determine whether said message had previously been received comprises: instructions for causing one or more processors to determine whether said message sequence indicator is one of the sequence indicators in a set of missing sequence indicators maintained in a table; and instructions for causing one or more processors to conclude, in response to a determination that said message sequence indicator is not one of the sequence indicators in said set of missing sequence indicators, that said message had previously been received***; and

instructions for causing one or more processors to forego, in response to a determination that said message had previously been received, delivery of said message to said one or more applications;

wherein a message exchange between a sender and a receiver is conducted ensuring that a message is delivered to a recipient at most once; and

wherein a subscriber is enabled to subscribe to multiple events using a single namespace specification and a single subscription request.

These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added.

Britton et al. disclose the communications between a source device and a destination device over a communications link by transmitting a message, with an

associated sequence identifier transmitted with it, stored in a source persistent queue at the source device over the external communication link to the destination device, which Examiner asserts is equivalent to the present invention, a reliable communication mechanism.

Applicants submit, however, that the Britton et al. invention is not equivalent because the present invention provides a set of missing sequence indicators maintained in a table. Specifically, Applicants provide “determining based upon said message identifier whether said message had previously been received, ***wherein determining whether said message had previously been received comprises: determining whether said message sequence indicator is one of the sequence indicators in a set of missing sequence indicators maintained in a table; and in response to a determination that said message sequence indicator is not one of the sequence indicators in said set of missing sequence indicators, concluding that said message had previously been received;***” ensuring a message exchange between a sender and a receiver is conducted ensuring that a message is delivered to a recipient at most once.

Britton et al. do not teach or suggest an “at most once” delivery guarantee and they do not teach or suggest a set of missing sequence indicators maintained in a table. Britton et al. merely disclose methods, systems, and computer program products to essentially serve as a checkpoint or restarting system. Duplicate messages occur.

For example, Britton et al. disclose in column 9 that “in the event of non-sequential transmission of messages, the largest number included in the persistent message queue 14 which is included in the commit message should be the largest sequence number of a continuous sequence of sequence numbers associated with a series of messages. Thus, for example, if sequence numbers 20, 21, 22, 23 and 27 were sent, then the largest sequence number would be 23 as it is the largest sequence number in a continuous sequence of sequence numbers.” In this example, the resync of the commit

messages would begin at 24 since 23 was the last sequence number of a continuous sequence of sequence numbers. Sequence number 27 will be resent when the queue is retransmitted beginning at sequence number 24, thus, a duplicate occurs. In the first paragraph in Column 9, continued from Column 8, Britton et al. recognize this possibility: "In any event, the committed sequence number received in the message from the receiving device 20 is persistently stored at the sending device to indicate the highest sequence number which has been committed by the receiving device 20 (block 116). It may then be determined if the received message was a resync message from the receiving device 20 (block 118). If the message was not a resync message then the message was a commit message and control waits for the next event. If the message was a resync message then messages in the send persistent message queue 14 which have a higher sequence number than the committed sequence number received in the resync message are transmitted to the receiving device 20 (block 120). ***Some of these messages may be re-transmissions.***" (emphasis added) ***Additionally, the sequence numbers in these messages are not reviewed against a set of missing sequence indicators maintained in a table.***

It is an object of the present invention to prevent duplicate messages. This is done in part through the use of a set of missing sequence indicators maintained in a table.

Claims 3-11 are dependent claims dependent on Claim 1. Claims 14-22 are dependent claims dependent on Claim 12. Claims 25-33 are dependent claims dependent on Claim 23.

Based on the same unique and novel features of the present invention as described above, namely that, as amended, Claims 1, 12, and 23 have unique and patentable novel features, precisely that they provide that a message exchange between a sender and a receiver is conducted ensuring that a message is delivered to a recipient at most once, it is respectfully asserted that these dependent claims are now in condition for allowance.

In addition, it is further noted that Britton et al. disclose an invention designed to allow “data to be more quickly available to applications communicating using the message queues.” (Col. 3, lines 32-34) What Britton et al. disclose is a checkpoint or restarting system that prevents large streams of data from being resent by allowing the data stream to pick up where it can verify the last sequential message was received. In other words, when communications of a data stream is interrupted or disconnected, the entire data stream need not be resent in its entirety. This, however, does not prevent duplicate messages from being sent when data is received in a non-sequential order. Such duplicate messages may cause harm to the recipient applications. This invention, on the other hand, guarantees that a duplicate message will not be received even when data is received non-sequentially. This protects the integrity of the data maintained in the receiving applications.

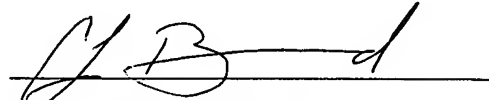
The differences between the invention of Britton et al. and the invention of the present Application are now made explicit in amended Claims 1, 12, and 23. Additionally, the deficiencies of Britton et al. are not remedied by either Piskiel et al. or Brasher et al. Therefore, Applicants submit that the rejection of Claims 1-33 under 35 U.S.C. 103(a), as being unpatentable over Britton et al. in view of Piskiel et al. and still in further view of Brasher et al., has now been overcome and respectfully request that this rejection be withdrawn.

CONCLUSION

Applicants would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

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Christopher L. Bernard
Registration No.: 48,234
Bradley D. Crose
Registration No.: 56,766
Attorneys for Applicant(s)

CLEMENTS | WALKER
1901 Roxborough Road, Suite 300
Charlotte, NC 28211 USA
Telephone: 704.366.6642
Facsimile: 704.366.9744
cbernard@worldpatents.com